

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

(12) UK Patent Application (19) GB (11) 2 268 778 (13) A

(43) Date of A Publication 19.01.1994

(21) Application No 9307810.3

(22) Date of Filing 15.04.1993

(30) Priority Data

(31) 9215171
9219916

(32) 16.07.1992
21.09.1992

(33) GB

(71) Applicant(s)

Michael Bradley Taylor
Cutwood, Uckfield Lane, HEVER, Kent, TN8 7BS,
United Kingdom

(72) Inventor(s)

Michael Bradley Taylor

(74) Agent and/or Address for Service

J Y & G W Johnson
Furnival House, 14-18 High Holborn, London,
WC1V 6DE, United Kingdom

(51) INT CL⁵

E05B 75/00

(52) UK CL (Edition M)

E2X X4

(56) Documents Cited

None

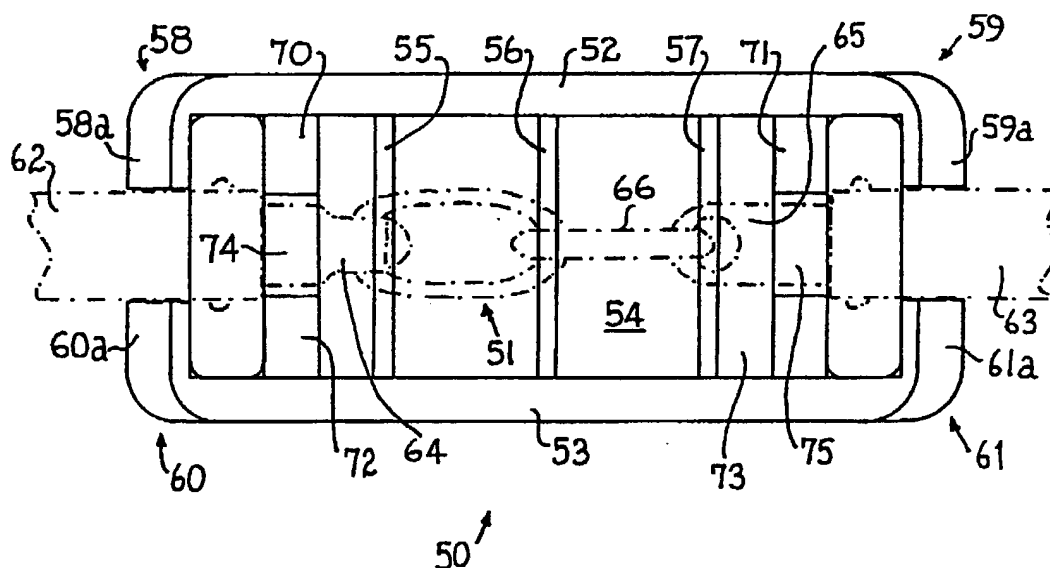
(58) Field of Search

UK CL (Edition L) E2X
INT CL⁵ E05B
Online database:WPI

(54) Improvements in or relating to handcuffs

(57) A channel-shaped handgrip (50) engages the chain 66 of handcuffs to provide a rigid connection between wrist units (62, 63) of the handcuffs. The handgrip (50) is moulded in a single unit from resilient plastics material and has side walls resiliently engageable with the wrist units (62, 63) when the handgrip is releasably secured to the handcuffs. The side walls have inner reinforcing ribs and the open side of the channel may be closed by a closure member formed separately from the handgrip or formed therewith and connected to the handgrip by a flexible hinge.

FIG 8



GB 2 268 778 A

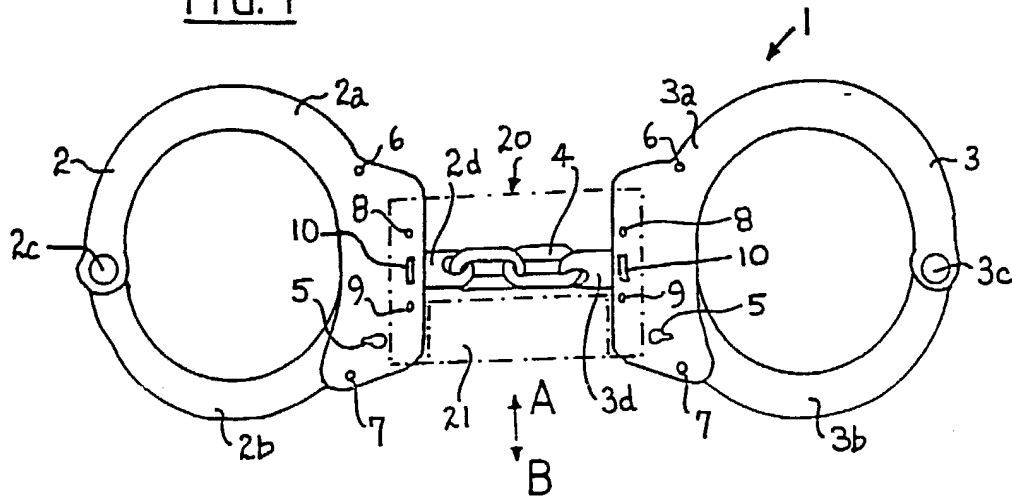
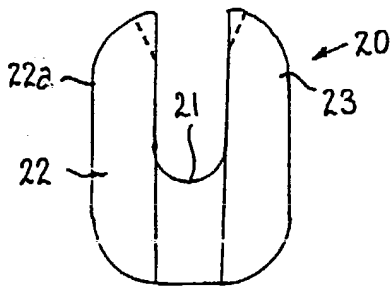
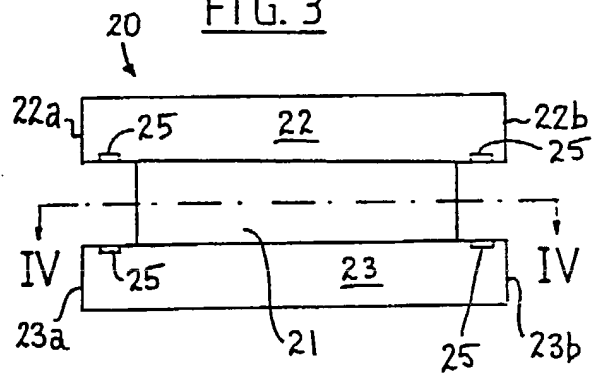
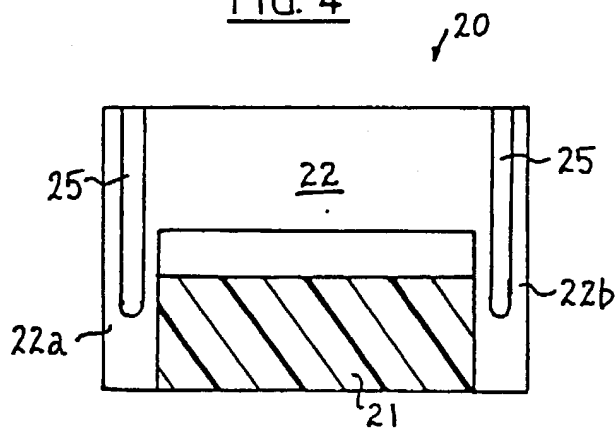
FIG. 1FIG. 2FIG. 3FIG. 4

FIG. 7

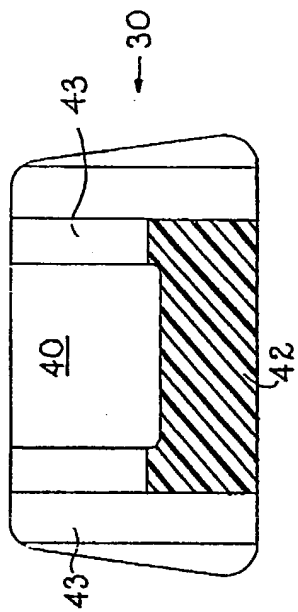


FIG. 5

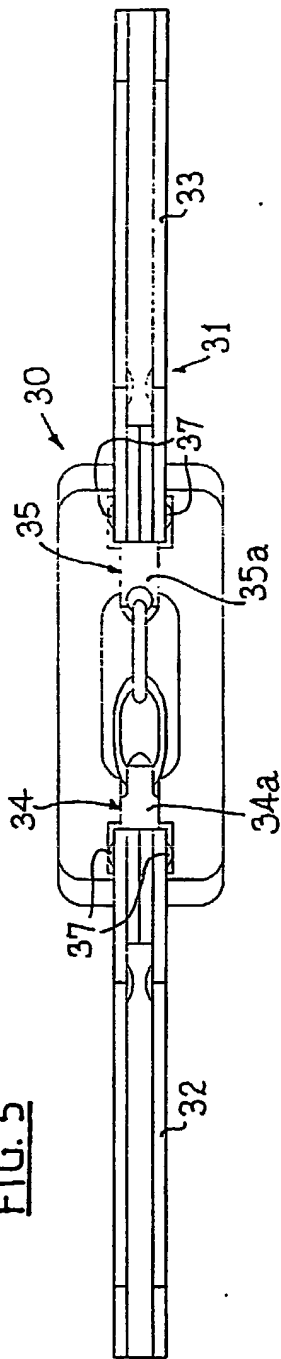


FIG. 6

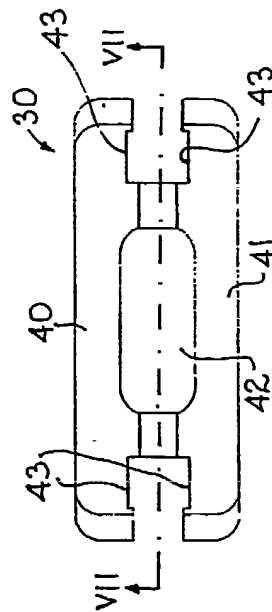


FIG 8

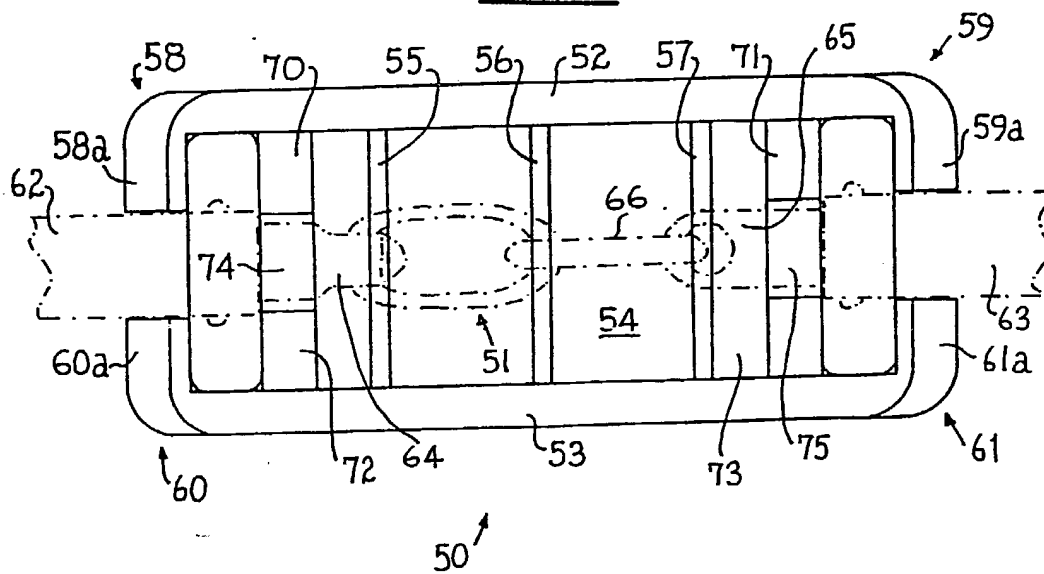


FIG 9

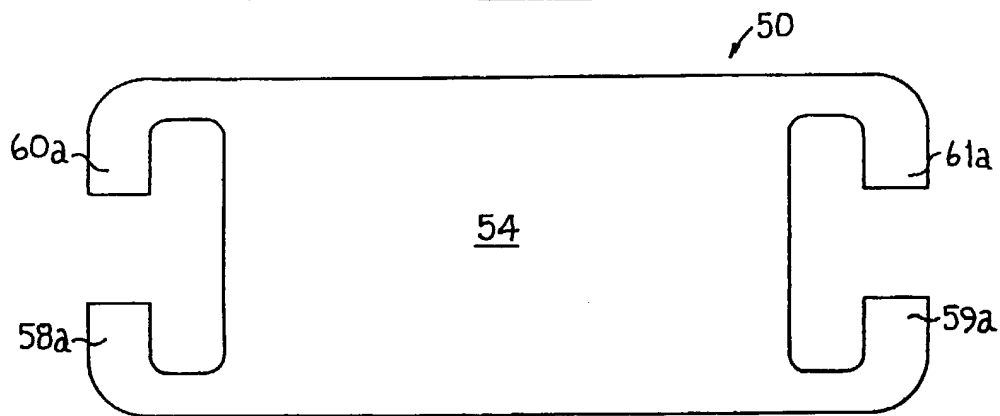


FIG 10

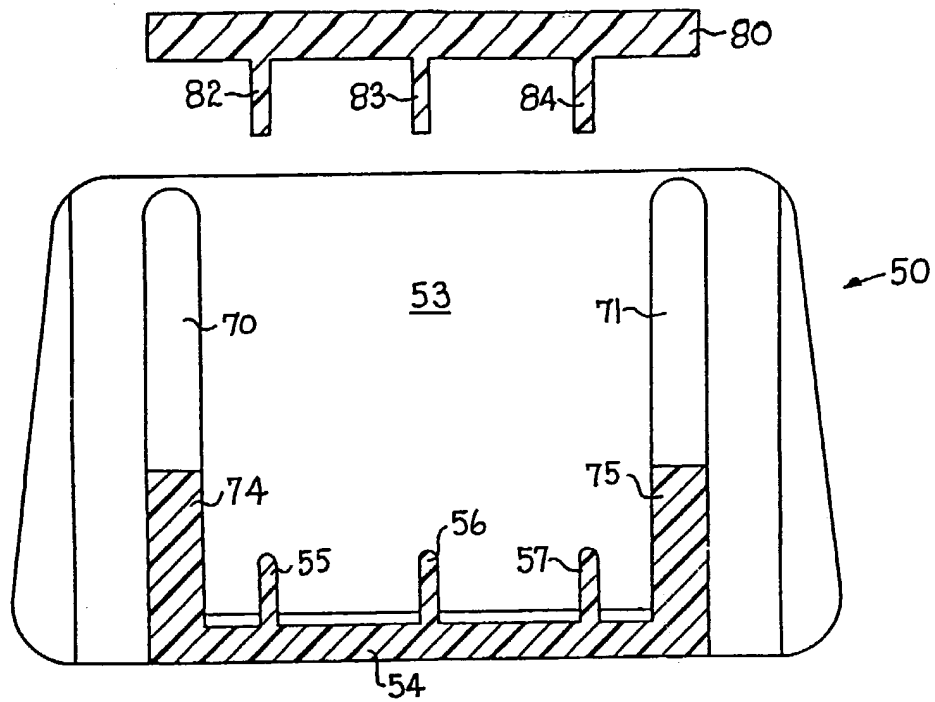


FIG 11

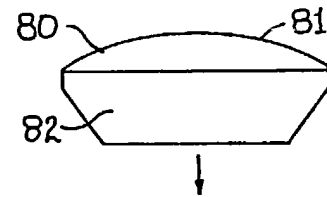
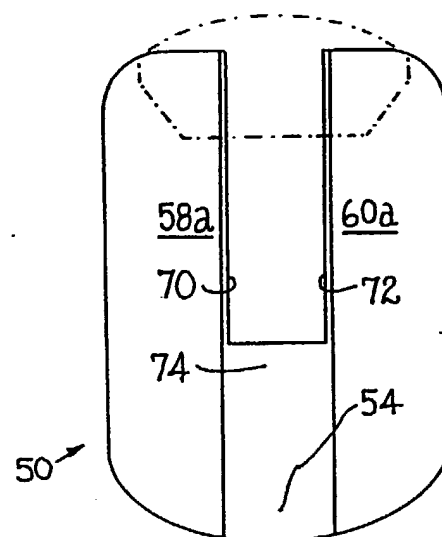
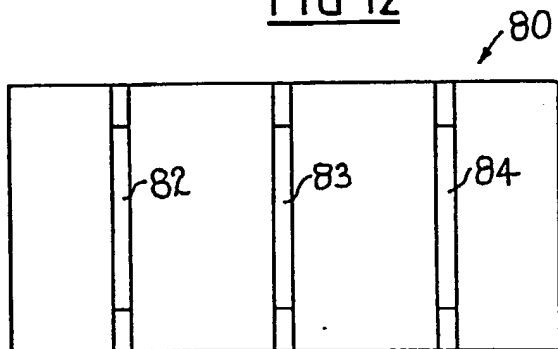


FIG 12



2268778

- 1 -

Improvements in or relating to handcuffs

This invention relates to handcuffs and in particular to a handgrip releasably securable to a pair of handcuffs to provide a rigid connection between wrist units of the pair
5 of handcuffs.

With a pair of handcuffs having a pair of expansible and contractible wrist units connected by a flexible connection, such as a chain, the wrist units are movable relative to each other. When not in use, the wrist units
10 can be positioned one on top of the other so as to form a relatively compact unit which can easily be retained in a pocket. When in use, the flexible connection between the wrist units enable a handcuffed person to manipulate his hands with a relatively large degree of freedom.

15 However in certain applications it is desirable to have a rigid connection between the two wrist units of a pair of handcuffs. For example, when dealing with an excessively violent individual it can be advantageous to have a rigid connection in the form of a handgrip securing
20 the two wrist units together in a common plane. A law enforcement officer apprehending a suspect is able to hold the handgrip and to connect one of the wrist units to one of the wrists of the suspect. By twisting or otherwise manipulating the rigid connection between the wrist units,
25 the law enforcement officer is able to exert pressure on the handcuffed wrist so more easily controlling the suspect. Once both the wrist units have been secured to an individual's wrists, the rigid connection will limit the degree of freedom of movement of the individual's wrists
30 relative to each other. This is important when dealing with possibly violent individuals or for rendering it more difficult for an individual to attempt to pick the locks of the handcuffs.

A known rigid connection for handcuffs is described
35 in US-A-4840048 and comprises two shaped plates bolted

together on opposite sides of the wrist units to provide a relatively permanent rigid connection between the wrist units. Although the plates can be disconnected from each other by unscrewing the bolts, this is a relatively time-consuming procedure and in practice law enforcement officers when on duty retain the plates in position on the handcuffs. This means that the wrist units cannot be folded against each other for carrying purposes and accordingly the handcuffs with the plates connected thereto are cumbersome to carry. Normally the law enforcement officer is required to wear a special holster supported from a belt in which the handcuffs are carried.

Another type of rigid connection for handcuffs is shown in US-A-3740977 and US-A-5007257. Each of these specifications discloses an easily releasable cover assembly comprising a pair of hinged together cover parts and a securing clip for retaining the cover parts in a closed position. In use the cover parts are hinged open, placed on opposite sides of the wrist units and connecting chain of the handcuffs, and then moved into the closed position. The clip is then moved into position to retain the cover parts in their closed position. Although such a known rigid connection is releasably securable to a pair of handcuffs, it consists of a number of parts which have to be assembled together and is relatively expensive to produce.

A yet further known rigid connection for handcuffs is disclosed in US-A-3616665 and comprises a handcuff shield consisting of two spaced apart plates rigidly connected together by a pair of braces. The shield primarily serves to cover key openings in the wrist units to prevent an apprehended person from attempting to pick the locks of the handcuffs. The shield loosely fits into position on the handcuffs with the plates covering the key openings of the wrist units and the connecting chain. The shield is retained in position by means of a waist chain connected to the apprehended person which passes through aligned holes formed in the spaced apart plates. A disadvantage with this

known handcuff shield is that it requires a waist chain or the like to secure the shield in position. Furthermore, since the braces connecting the plates together are welded or bonded to the plates, the manufacture of the shield
5 involves a number of manufacturing steps.

An aim of the present invention is to provide a handgrip for a pair of handcuffs which is easily connected to and disconnected from the handcuffs and which is relatively cheap and simple to manufacture.

10 According to the present invention there is provided a combination of a pair of handcuffs having expansible and contractible wrist units connected together by flexible connecting means and a channel-shaped handgrip having a
15 bottom wall and spaced apart side walls and which is releasably securable to the handcuffs to provide a rigid connection between the wrist units with the flexible connecting means extending between the side walls, the handgrip being moulded in a single unit from resilient
20 plastics material and, when in its secured position, having its side walls in resilient engagement with parts of the wrist units and its bottom wall extending between the wrist units.

Since the handgrip is moulded as a single unit it can be produced relatively easily and cheaply. The resilience
25 of the plastics material enables the handgrip to be moved relatively easily into and out of its secured position.

Conveniently the pair of handcuffs are conventional handcuffs, the handgrip being an accessory therefor which can be easily connected to, or disconnected from, the
30 handcuffs as required in any particular situation.

Preferably each wrist unit is substantially flat and has one or more projections projecting from each side. Such projections may comprise the opposite ends of rivets joining wrist unit parts together or housings for swivel connections

to which chain links, constituting the flexible connecting means, are connected. In this case the inner surface of each side wall may be provided with at least one channel, extending perpendicular to the channel direction from the upper edge of the side wall towards the bottom wall, for receiving the wrist unit projections.

The bottom wall preferably has a smaller length than the side walls, the side walls projecting beyond the bottom wall at each end of the handgrip. These projecting side wall end portions are intended to receive therebetween, and to interengage with, the said wrist unit parts when the handgrip is in its secured position. In a particularly preferred embodiment of the handgrip, the two side wall end portions at each end of the handgrip have parts which extend inwardly, these inwardly extending parts of each side wall extending towards the other side wall and being intended to resiliently interengage with the wrist unit parts. Each side wall end portion may have a single inwardly extending part typically extending from top to bottom of the side wall. Alternatively, however, each side wall end portion may have two or more inwardly extending parts for engaging a wrist unit part at spaced apart locations.

In an alternative design of handgrip according to the invention, the facing inner surfaces of the side walls are shaped to provide an interference grip with projections, e.g. rivets, projecting from opposite sides of each wrist unit. For example, the projections may be received in grooves or channels formed in the inner surfaces of the side walls and extending in the top to bottom direction.

The handgrip is preferably moulded from a resilient plastics material, e.g. a reinforced plastics material, such as glass fibre filled nylon, which is relatively hard and relatively inflexible. With its channel-shaped form, the opposite side walls of the handgrip can be resiliently deflected a small amount towards and away from each other on the application of suitable deflecting forces on the side

walls. In use, the deflecting forces are provided by pushing the wrist units between the side walls towards the bottom of the handgrip so that the side walls are resiliently deflected slightly outwardly. The resilience of the handgrip ensures that the handgrip is resiliently retained in position on the wrist units.

The handgrip may be provided with inner reinforcing ribs, e.g. on the bottom wall extending from one to the other of the side walls.

10 Conveniently a closure member is releasably positionable in a closed position to close the open side of the channel-shaped handgrip opposite the bottom wall of the latter. In its closed position, the closure member thus serves as a top wall for the handgrip. The closure member
15 may be formed separately from the handgrip and may remain separated therefrom or may be attached, releasably or permanently, to the handgrip. Alternatively, however, the closure member is integrally formed with the handgrip and is joined to the latter by a flexible integral connection. In
20 this latter case, the closure member will be of the same material as the handgrip. If the closure member is formed separately from the handgrip it is not essential for it to be made of the same material as the handgrip but normally it would be made of the same material.

25 Suitably the outer surface of the bottom wall of the handgrip is rounded for comfort when gripped. If a closure member is provided, it also conveniently has a rounded outer surface.

Embodiments of the invention will now be described by way of example with particular reference to the accompanying drawings in which:

Figure 1 is a view, on a reduced scale, of a conventional pair of handcuffs shown in full lines and a handgrip shown in chain lines in a secured position,

Figures 2 and 3 are an end view and a view from above, respectively, of the handgrip shown in Figure 1,

5 Figure 4 is a section taken on the line IV-IV of Figure 3,

Figure 5 is a view from above showing another embodiment of a handgrip releasably secured to a pair of conventional handcuffs,

10 Figure 6 is a view from above of the handgrip shown in Figure 5,

Figure 7 is a sectional view taken on the line VII-VII of Figure 6,

15 Figures 8 and 9 are views from above and below, respectively, of another embodiment of handgrip for use with handcuffs of the type shown in Figures 1 and 5,

Figure 10 is a sectional view taken on the line X-X of Figure 8 and showing a closure member just prior to connection to the handgrip,

20 Figure 11 is an end view of the handgrip and closure member shown in Figure 10, and

Figure 12 is a view from below of the closure member shown in Figures 10 and 11.

Figure 1 shows a conventional pair of handcuffs, 25 generally designated by the reference numeral 1, comprising a pair of similar expansible and contractible wrist units 2 and 3 joined together by a chain 4. Each wrist unit 2(3) comprises a fixed base member 2a(3a) containing a ratchet mechanism (not shown), and a lock (not shown) lockable and 30 unlockable via a keyhole 5, and a pivotable part 2b(3b)

pivotally connected to the base member 2a(3a) via a pivot 2c(3c). Each base member 2a(3a) carries a swivel connector 2d(3d) to which the chain 4 is connected.

5 The wrist units 2 and 3 are generally flat and the base members suitably include spaced apart plates between which the pivotable parts 2b and 3b are pivotally movable. These plates are conveniently joined together by a number of rivets 6-9 which project from the generally flat surfaces of the wrist units. The inner surfaces of the plates are also
10 deformed outwardly to form seatings for cylindrical ends (not shown) of the swivel connectors 2d and 3d. These outward deformations can be seen as projections 10 in Figure 1.

A channel-shaped moulded plastics handgrip 20 (shown
15 in chain lines in Figures 1 and in more detail Figures 2 to 4) is releasably secured to the handcuffs to provide a rigid connection between the wrist units 2 and 3. The handgrip 20 comprises a bottom wall 21 and spaced apart side walls 22 and 23 extending therefrom. The side walls 22 and 23 are of
20 greater length than the bottom wall 21 and have end projecting portions 22a, 22b and 23a, 23b, respectively, projecting past the opposite ends of the bottom wall 21. Grooves or channels 25 are formed on the inside surface of each end projecting portion 22a, 22b, 23a and 23b and extend
25 from the top of each side wall towards the bottom. As can be seen in Figure 2, the bottom wall 21 and side walls 22 and 23 have rounded external surfaces to provide a handgrip having rounded corners. The handgrip 20 is moulded from a hard, resilient plastics material. A convenient material is
30 found to be a glass fibre filled nylon, e.g. nylon containing 20% glass fibre, which may also contain a carbon black filler.

In use, the handgrip is designed to be slid in direction A (see Figure 1) onto the handcuffs into its
35 secured position shown in dashed lines. The handgrip 20 is released from its secured position by sliding the handgrip

back in the opposite direction B off the handcuffs. During connection of the handgrip 20 on the handcuffs 1, the projections 8-10 are aligned with and received in the channels 25 as the handgrip is slid into its secured position. The handgrip is dimensioned so that the side walls 22 and 23 resiliently interengage with the wrist units 2 and 3, respectively, when in its secured position. In the secured position shown in Figure 1, the bottom wall 21 extends between the wrist units 2 and 3 when the chain 4 is in an extended position and part of the wrist unit 2 is positioned between the end projecting portions 22a and 23a and part of the wrist unit 3 is positioned between the end projecting portions 22b and 23b.

The resilient interengagement between the handgrip 20 and the handcuffs 1 can take a number of different forms. The side walls 22 and 23 could simply be inclined slightly inwardly towards each other so as to tightly resiliently grip the wrist units as the handgrip is pushed into its secured position. Alternatively, for example, the channels 25 may be dimensioned to resiliently wedge the projections 8-10 between the channel side walls as the handgrip is pushed into its secured position. Alternatively some form of indent or the like could be provided in the channels 25 to interengage with one or more of the projections 8-10 when the handgrip is in its secured position. The primary purpose of the resilient interengagement is to provide a grip or interengagement with cooperating parts of the wrist units to prevent the handgrip coming unintentionally free from the handcuffs in use. Release of the handgrip is a relatively simple procedure involving moving or sliding the handgrip in direction B (see Figure 1) against any resilient interengagement of the handgrip and handcuffs until the handgrip is completely detached from the handcuffs.

When the handgrip 20 is detached from the handcuffs 1, the wrist units 2 and 3 can be positioned so as to overlie one another in a compact form suitable for carrying in a pocket or the like and the handgrip 20 can be placed in

another pocket. When it is required to convert the handcuffs into a rigid handcuff assembly, it is a simple procedure to slide the handgrip 20 in direction A (see Figure 1) onto the handcuffs 1, the resilience of the
5 handgrip material coacting with the metal wrist units 2 and 3 to retain the handgrip in the secured position on the handcuffs.

The handgrip is of a simple design and can be manufactured relatively cheaply whilst providing an easily
10 detachable rigid connection between the wrist units of a pair of handcuffs.

To facilitate pushing the handgrip 20 on to the handcuffs, the "upper" inside edges of the side walls 22 and 23 may be bevelled, for example as shown in dashed lines in
15 Figure 2.

Figures 5 to 7 show a modified handgrip, generally designated 30, for releasable attachment to a conventional pair of handcuffs 31. The handcuffs 31 are of the same kind as shown in Figure 1 and are chain-linked handcuffs of the
20 type supplied to the Metropolitan Police Service by Hiatt & Company Limited of Birmingham, England. The handcuffs have wrist units 32, 33 each having a swivel connector 34, 35, respectively, rotatably mounted thereon. A chain link 36 connects the swivel connectors 34 and 35. The swivel
25 connectors 34 and 35 have cylindrical barrel portions 34a and 35a, respectively, and each have a circular base (not shown). The opposite sides of each wrist unit 32, 33 are deformed outwardly to define part-circular projections 37 for rotatably receiving the circular bases of the swivel
30 connectors.

As with the handgrip shown in Figures 1 to 4, the handgrip 30 is made from a hard, resilient plastics material such as a glass fibre filled nylon, e.g. nylon containing 20% glass fibre which may also contain a carbon black
35 filler. The percentage of glass fibre filler is not

considered to be critical and good results have been achieved with only 10% glass fibre filler.

5 The handgrip 30 is of generally channel shape and has spaced apart side walls 40 and 41 and a bottom wall 42. The ends of the handgrip 30 are tapered so that the handgrip is trapezium shaped when viewed from the side (see figure 7). The inner surfaces of the side walls 40 and 41 are provided with substantially parallel grooves 43 extending perpendicular to the channel direction of the handgrip. The bottom of each facing pair of grooves 43 are spaced apart slightly less than the spacing apart of the opposed projections 37 on each pair of wrist units. When the handgrip 30 is connected to the pair of handcuffs 31 as shown in Figure 5, each pair of opposed projections 37 make interference fits between the associated pair of grooves 43, the side walls 40 and 41 being resiliently deflected slightly outwards and therefore applying retaining forces retaining the handgrip in position. The side walls 40, 41 are spaced apart, adjacent the swivel connectors 34 and 35, so as either to also provide interference fits with the barrel portions 34a and 35 or to be positioned closely adjacent the barrel portions to assist in retaining the wrist units in a common plane. The portions of the side walls outwardly of the grooves 43 are also designed to be closely positioned against the opposite sides of the wrist units to assist in retaining the wrist units in a common plane.

30 The tapering, trapezium shape of the handgrip 30 is designed so that the shorter "upper" part of the handgrip does not cover the keyholes (5 in Figure 1) of the wrist units when the handgrip is positioned on the handcuffs. At the same time the longer "bottom" of the handgrip extends over a greater part of each wrist unit to assist in retaining the wrist units in a common place.

35 Another feature of the modified design of handgrip 30 is the inner side wall of each groove 43. These inner

groove side walls are positioned inwardly of the bases of the wrist units 32 and 33 and serve to prevent the wrist units from turning about axes perpendicular to the planes of the side walls.

- 5 The central part 50 of the inner surface of each side wall is recessed to provide a relatively large spacing between the side walls for receiving the chain link 36.

 A third embodiment of a channel-shaped, moulded plastics handgrip, generally designated 50, is shown in
10 Figures 8-12. Again the handgrip 50 is intended for releasable attachment to a conventional pair of handcuffs 51 (shown in dashed lines in Figure 8) of the same type as shown in Figure 5 and having wrist units 62 and 63.

 The handgrip 50 has spaced apart side walls 52,53
15 joined by a bottom wall 54. Strengthening ribs 55-57 project from the bottom wall 54 and extend fully between the side walls 52 and 53. Opposite ends of the side walls 52 and 53 have side wall end portions 58,59 and 60,61, respectively, which project at opposite ends of the bottom
20 wall 54. Each of these side wall end portions 58-61 has an inwardly projecting part 58a-61a, respectively. In use the wrist unit 62 is resiliently removably received between the parts 58a and 60a and the wrist unit 63 is resiliently removably received between the parts 59a and 61a.

25 Swivel connectors 64 and 65 are joined to opposite ends of a connecting chain 66, the swivel connectors 64 and 65 being connected to the wrists units 62 and 63, respectively. The swivel connectors 64 and 65 are received between inwardly projecting portions 70 and 71 on the side
30 wall 52 and inwardly projecting portions 72 and 73 on the side wall 53. The portions 70 and 72 are joined to a strengthening web 74 extending upwardly from the bottom wall 54 between the side walls 52 and 53, and the portions 71 and 73 are joined to a strengthening web 75 extending upwardly
35 from the bottom wall between the side walls 52 and 53.

It will be seen that projections on the wrist units 62 and 63 do not resiliently engage with the side walls 52 and 53 in this particular embodiment of handgrip.

The handgrip 50 has a plastics closure member 80 (see
5 Figures 10 to 12) comprising a rounded top plate 81 and
spaced apart transverse ribs 82-84. . The closure member 80
is intended to be removably positionable in a closing
position, shown in chain lines in Figure 11, for closing the
top of the handgrip 50 after the handgrip has been attached
10 to a pair of handcuffs. In the closing position of the
closure member 80 the transverse ribs 82-84 are resiliently
retained between the side walls 52 and 53 and the rounded
top surface of the top plate 81 closely conforms with the
rounded upper edges of the side walls. Since the outer
15 surface of the bottom wall 54 is also rounded, the handgrip
50 has rounded top and bottom walls when the closure members
is in its closing position for facilitating handling of the
handgrip when attached to a pair of handcuffs.

The closure member 80 is shown separated from the
20 handgrip 50. However in other embodiments it would be
attached to the handgrip 50 either integrally with an
integral connection or by means of connecting means, e.g. a
connecting link. The inner surfaces of the side walls 52
and 53 and/or parts of the closure member 80 may be formed
25 with recesses or projections to better retain the closure
member in its closing position. Instead of being provided
with the transverse ribs 82-84, the closure member 80 may
have other engaging means, e.g. four downwardly depending
legs or the like (not shown) resiliently engageable with the
30 sidewalls of the handgrip.

CLAIMS

1. A combination of a pair of handcuffs having
expansible and contractible wrist units connected together
by flexible connecting means and a channel-shaped handgrip
5 having a bottom wall and spaced apart side walls and which
is releasably securable to the handcuffs to provide a rigid
connection between the wrist units with the flexible
connecting means extending between the side walls, the
handgrip being moulded in a single unit from resilient
10 plastics material and, when in its secured position, having
its side walls in resilient engagement with parts of the
wrist units and its bottom wall extending between the wrist
units.

2. A combination according to claim 1, in which
15 each wrist unit of the pair of handcuffs is substantially
flat and has one or more projections projecting from each
side.

3. A combination according to claim 2, in which
said projections comprise the opposite ends of rivets
20 joining wrist unit parts together and/or housing for swivel
connections to which chain links, constituting the flexible
connecting means, are connected.

4. A combination according to claim 2 or 3, in
which the inner surface of each side wall of the handgrip is
25 provided with at least one channel, extending perpendicular
to the channel direction from the upper edge of the side
wall towards the bottom wall, for receiving the wrist unit
projections.

5. A combination according to any of the proceeding
30 claims, in which the bottom wall of the handgrip has a
smaller length than the side walls, the side walls
projecting beyond the bottom wall at each end of the
handgrip for receiving therebetween, and interengaging with,
the said wrist unit parts when the handgrip is in its

secured position.

6. A combination according to claim 5, in which the two side wall end portions at each end of the handgrip have parts which extend inwardly, these inwardly extending parts
5 of each side wall extending towards the other side wall and being intended to resiliently interengage with the wrist unit parts.

7. A combination according to claim 6, in which each side wall end portion has a single inwardly extending
10 part typically extending top to bottom of the side wall.

8. A combination according to claim 1, in which the facing inner surfaces of the side walls of the handgrip are shaped to provide an interference grip with projections projecting from opposite sides of each wrist unit.

15 9. A combination according to claim 8, in which are received in grooves or channels formed in the inner surfaces of the side walls and extending in the top to bottom direction.

10. A combination according to any of the preceding
20 claims, in which the handgrip is moulded from a resilient plastics material which is relatively hard and relatively inflexible.

11. A combination according to any of the preceding claims, in which the handgrip is provided with inner
25 reinforcing ribs.

12. A combination according to claim 11, in which the inner reinforcing ribs are formed on the bottom wall and extend from one to the other of the side walls.

13. A combination according to any of the preceding
30 claims, further comprising a closure member releasably positionable in a closed position to close the open side of

the channel-shaped handgrip opposite the bottom wall of the latter.

14. A combination according to claim 13, in which the closure member is formed separately from the handgrip.

5 15. A combination according to claim 13, in which the closure member is attached, releasably or permanently, to the handgrip.

10 16. A combination according to claim 13, in which the closure member is integrally formed with the handgrip and is joined to the latter by a flexible integral connection.

15 17. A combination according to any of claims 13 to 16, in which the closure member has engaging means which resiliently engage with the side walls of the handgrip when in said closed position.

18. A combination according to any of the preceding claims, in which the outer surface of the bottom wall of the handgrip is rounded for comfort when gripped.

20 19. A combination according to any of claims 13 to 17, or claims 18 when dependent on any of claims 13 to 17, in which the closure member has a rounded outer surface.

25 20. A handgrip for use with a pair of handcuffs, the handgrip being constructed and arranged substantially as herein described with reference to Figures 1 to 4, Figures 5 to 7 or Figures 8 to 12 of the accompanying drawings.

- 16 -

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

GB 9307810.3

Relevant Technical fields

(i) UK CI (Edition L) E2X

(ii) Int CI (Edition 5) E05B

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Search Examiner

A H MITCHELL

Date of Search

12 JULY 1993

Documents considered relevant following a search in respect of claims 1-20

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

Category	Identity of document and relevant passages	Relevant to claim

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).